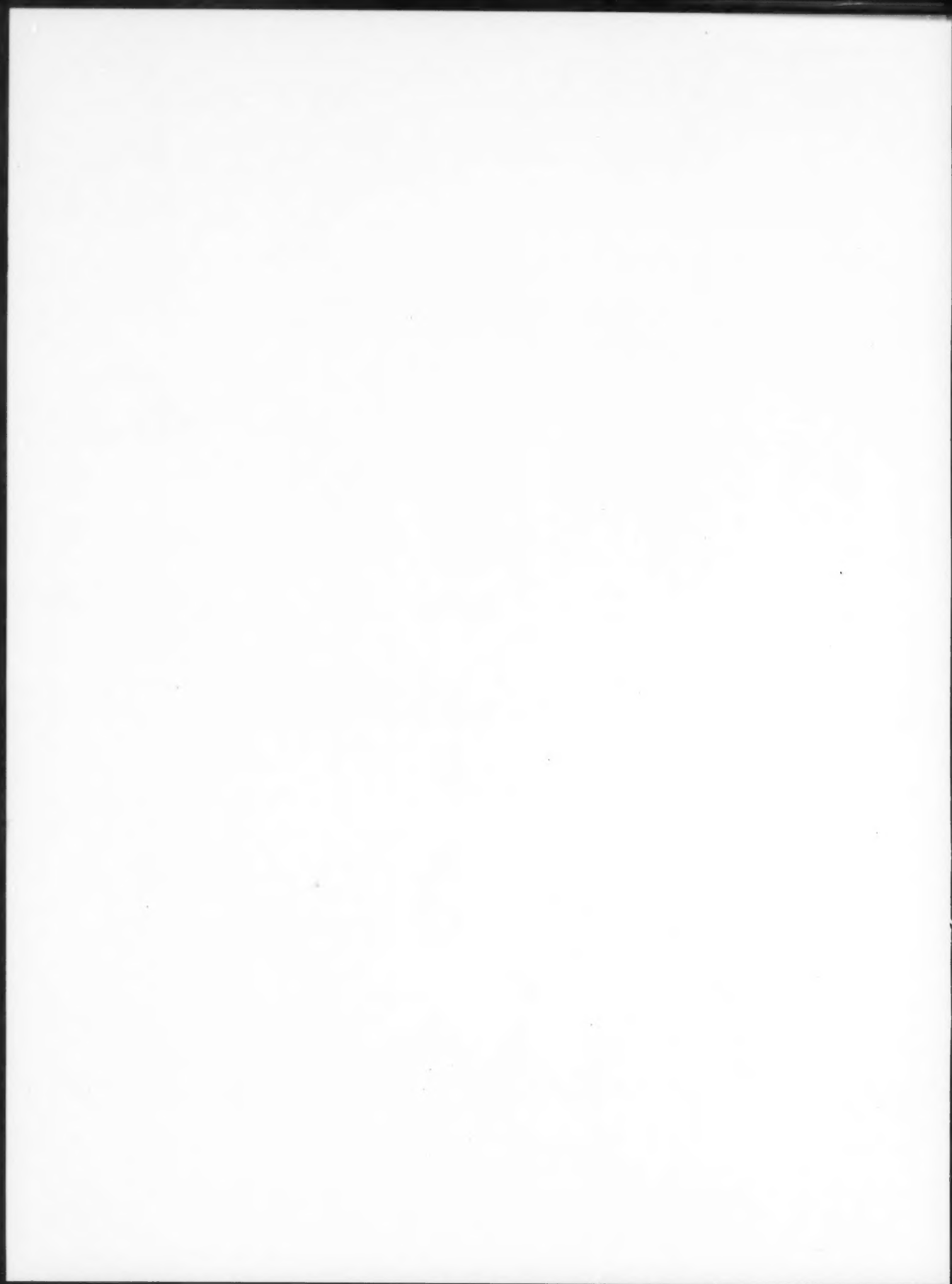


CRUSHED STONE JOURNAL



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Cover Photograph—Bound Brook Quarry
of Houdaille Construction Materials, Inc.,
Bound Brook, New Jersey

Everyone's Invited!

NATIONAL CRUSHED STONE ASSOCIATION

43rd Annual Convention

and

Manufacturers Division Exposition

February 22, 23, 24, 1960

Conrad Hilton, Chicago, Illinois

Timely and Informative Subjects
by Nationally Known Speakers

Discussions of Special Interest to
Executives, Operating Men, and Salesmen

Exhibits Featuring the Newest Developments
in Machinery and Equipment

for special hotel reservation cards write . . .

NATIONAL CRUSHED STONE ASSOCIATION

1415 Elliot Place, N. W.

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Washington 7, D. C.

43rd Annual Convention—Outstanding Event of 1960

Record Attendance Predicted

QUARRY operators from all parts of the United States and Canada will meet for the National Crushed Stone Association 43rd Annual Convention and Manufacturers Division Exposition which will be held February 22, 23, 24, 1960, at the Conrad Hilton, Chicago, Illinois.

The Manufacturers Division Exposition, held in even years in conjunction with the Annual Convention, will again be an outstanding attraction at the forthcoming meeting. The large number of exhibitors participating in the Exposition presents an unparalleled opportunity for viewing first hand the most complete and comprehensive display of machinery, equipment, and supplies used in the crushed stone industry. To permit the hundreds of quarry operators who will be in attendance ample time to get the greatest possible benefit from this "show of shows" the Exposition will be open throughout the entire Convention period and two full Convention sessions—Monday afternoon and Wednesday morning—will be devoted exclusively to the inspection of the Exposition.

Information from the Conrad Hilton as to advance room reservations gives every indication that this year's Convention will be one of the largest ever held by the Association. If you have not already done so, it is strongly suggested that you make your hotel room reservations immediately.

A brief review of some of the outstanding features of the Convention program will quickly convince you that attendance at the 43rd NCSA Annual Convention will be one of the best investments you can make in 1960.

Opening Session

The Convention's first general session will open promptly at 9:30 Monday morning, February 22. The presiding officer will be NCSA President W. C. Rowe of Rowe Contracting Co., Malden, Massachusetts. His message of greeting to the assembled members and guests will be followed by "NCSA In Action"—brief reports from Execu-

tive Director J. R. Boyd, Engineering Director J. E. Gray, and Engineering Consultant A. T. Goldbeck on the many activities of the Association and how they benefit the members. These reports will be followed by the showing of the new NCSA film "Graded Aggregate Base Course Construction." This excellent 16 mm color sound movie presents in detail the application and use of graded aggregate base course and shows the various methods of application. No quarry operator supplying this type of stone can afford to miss this important new film.

The intriguing title "Cave Man to Space Man" brings many interesting thoughts to mind. When J. Lewis Powell, consultant to industry and government, unfolds his dynamic story at this Monday morning session, we guarantee you will sit up and take notice. His fascinating presentation is sure to leave the audience somewhat awed by the rapid march of civilization and keenly aware of the vital need for management to keep abreast of current developments.

Greeting Luncheon

At Monday's Greeting Luncheon, O. E. Benson, President, General Crushed Stone Co., Easton, Pennsylvania, will preside. The new NCSA Officers and Executive Committee, elected at the organizing meeting of the Board of Directors, will be introduced by Mr. Benson, following which H. H. Kirwin, Chairman of the NCSA Accident Prevention Committee, will present the new NCSA Safety Award Plaques. A brief luncheon address will be given by Paul Jones, Director of Public Information of the National Safety Council, who will speak on "What's the Use?" Mr. Jones' highly amusing yet thought provoking comments will delight and please all who hear him.

Manufacturers Division Exposition

Monday afternoon has been set aside for inspection of the Manufacturers Division Exposition. It should be remembered that the manufacturers of machinery and equipment will have present at

the Convention their technical men who will be available to quarry operators for consultation on problems of a specialized nature.

The character of the exhibits to be displayed clearly indicate that the members of the Division are going all out to make this Exposition the most comprehensive and informative show since the establishment, many years ago, of this feature of the Annual Convention.

Special Session for Operating Men

On Tuesday morning, February 23, operating men and equipment manufacturers will have an opportunity to hear and ask questions of recognized authorities on important operating problems. A special committee gave much thought to the selection of subjects which it felt would be of universal appeal to the operating man. Montagu Hankin, Jr., Executive Vice President, Houdaille Construction Materials, Inc., Morristown, New Jersey, will preside over this important meeting which should develop a gold mine of useful information.

Following each presentation, ample time has been scheduled for questions which will permit those in attendance to seek answers from the eminently well qualified speakers.

Special Concurrent Luncheons

A special Luncheon Session for Company Executives will be held at 12:00 noon on Tuesday with John F. Lane, Gall, Lane and Howe, Washington, D. C., General Counsel for the National Crushed Stone Association, presiding. Mr. Lane will give an informal analysis of current congressional attitudes, federal laws, and administrative regulations. This session for company policy makers has grown in interest and participation each year and has become an important feature of the Convention program.

At 12:30 on Tuesday the Manufacturers Division Luncheon, for members of the Manufacturers Division only, will be held. The newly elected Officers and Executive Committee of the Division will be introduced and members brought up to date on the various activities of the Division.

Wednesday Exposition Hours

Wednesday, February 24, starts with an inspection of the Manufacturers Division Exposition which will be open from 9 until noon. Plan to spend the time profitably discussing your problems with the manufacturers' representatives.

General Luncheon

The General Luncheon on Wednesday will be presided over by NCSA Vice President George D. Lott, Jr., of Palmetto Quarries Co., Columbia, South Carolina. The luncheon address will be by Dr. Nicholas Nyaradi, Director, Institute of International Studies, Bradley University, Peoria, Illinois, and former Minister of Finance in the Hungarian Cabinet. The subject of Dr. Nyaradi's address will be "Shall We Survive?"

We are exceedingly fortunate in being able to have Dr. Nyaradi on our program and this luncheon should certainly be one of the highlights of the Convention.

Final Session

Wednesday afternoon the general session will start promptly at 2:30 when J. P. Datesman, Process Engineer, Chicago and North Western Railway Company, discusses "Modern Ballasting Practices." Mr. Datesman's extensive experience and know-how of his subject should give quarry operators a real insight into the successful use of crushed stone for ballasting purposes.

"Highways and the National Economy" will be discussed by Ellis Armstrong, Commissioner, U. S. Bureau of Public Roads, Washington, D. C. Mr. Armstrong's understanding and knowledge of the Federal Highway Program and its effect on the nation's economy will prove of real interest to all.

"Evaluating Quality Requirements for Aggregates" will be presented by F. V. Reagel, Engineer of Materials, Missouri State Highway Commission, Jefferson City, Missouri. For many years Mr. Reagel has been known as a tireless champion of quality aggregates. His comments should prove helpful and beneficial to member producers in connection with providing road stone for our nation's highways.

The final speaker will be Dr. B. G. Gross, Executive Secretary, Northtown Industrial Management Club, Chicago, Illinois, who has a real message for us and wraps it up into a delightful package of wit, humor, and human understanding. His topic is "Nothing Is Wrong With Me—Everyone Else Is Crazy."

Dining — Entertainment — Dancing

Wednesday evening affords a gay climax for everyone present at the Convention to get

(Continued on page 6)



James Albert Rigg 1881-1959

IT IS with deep regret and sincere sorrow that we announce the death of James Albert Rigg, founder and President of the Acme Limestone Co. of Fort Spring, West Virginia. Mr. Rigg passed away at his home in Alderson, West Virginia, on September 21, 1959, after a brief illness.

Mr. Rigg will long be remembered among his host of friends in the crushed stone industry for his fine traits of character which endeared him to all with whom he had contact.

A man of great vision and foresight, he became impressed with the vast deposits of limestone in the vicinity of Alderson, West Virginia, and in 1916 with two associates founded the Acme Limestone Co. It was largely through his personal efforts that this company grew with rapid strides to its present position as a recognized leader in the industry.

Actively interested in the affairs of the Association since his company joined in the early twenties, Mr. Rigg was first elected to the Board of Directors in 1931 and served continuously until his death.

The highest honor within the power of the Association to bestow was accorded Mr. Rigg when in 1941 and again in 1942 his fellow members elected him to the Presidency. During his administration the Association held its Silver Anniversary Banquet in Cincinnati in February of 1942 and on that memorable occasion Toastmaster Otho M. Graves paid fitting and appropriate tribute to Mr. Rigg in the following words:

"I know of no one who is more modest in his character; who is more quick to give credit to others where it is really due to him; nor do I know of anyone who more vigorously and patiently and persuasively advocated the cause of research in this industry by our Association."

He is survived by his widow, the former Ruth Pratt, and three daughters: Mary Virginia (Mrs. Monroe C. Fisher), Marjory M. (Mrs. Frank S. Crawford), and Barbara Lee (Mrs. James H. Pratt).

We are deeply saddened in the knowledge that Mr. Rigg is no longer with us. To his family and business associates, we extend our deep and heartfelt sympathy.

43rd Annual Convention

(Continued from page 4)

together for the highly desirable objective of simply having a good time. The evening's entertainment will feature a potpourri of some of the nation's finest vaudeville acts. Following the excellent floor show there will be music for your dancing pleasure. Everyone will want to attend this evening of fun and frolic.

Ladies Program

A special program has been planned for the ladies, assuring them of a thoroughly delightful time throughout the 43rd Annual Convention. In addition to the special activities, many features of the regular Convention program will be particularly appealing—the Greeting Luncheon on Monday, the General Luncheon on Wednesday, and, of course, Wednesday's Party Night.

All Are Invited to Attend

All crushed stone producers and others interested in the crushed stone industry, whether or not they are members of the National Crushed Stone Association, are cordially invited to attend the 43rd Annual Convention in Chicago, February 22, 23, 24, 1960. Make your plans now to be present. /NCSA

Howard M. Bixby Resigns to Accept Position With ICA

HOWARD M. BIXBY, who for the past 2 1/2 years, held the position of Field Engineer for the National Crushed Stone Association, has resigned to accept a new position with the International Cooperation Administration of the United States Government, effective October 20, 1959.

As a Project Management Engineer in the Transportation Division of ICA, Mr. Bixby's new duties could take him into any part of the world where the United States has a mission or a contract with a nation for technical assistance. In this capacity he will plan, program, and implement various highway, air field, and waterway projects as they are assigned him.

Mr. Bixby came to the National Crushed Stone Association in July 1957 from the United States

Bureau of Public Roads. During his employment he traveled extensively throughout the United States consulting with members on their individual problems, and upon request with local and state highway departments on specifications and uses of crushed stone.

The entire Association joins in extending to Mr. Bixby best wishes in his new position. /NCSA

More Than \$2.7 Billion in Highway Funds Apportioned for Fiscal 1961

A federal-aid apportionment of \$2,725,000,000 to the states for fiscal year 1961 for the expanded national highway program has been announced by Secretary of Commerce Frederick H. Mueller.

Of this amount, \$1.8 billion will be for interstate system construction and \$925 million will be for the federal-aid primary and secondary systems and their urban extensions.

The 1961 fiscal year begins July 1, 1960.

Secretary Mueller stated that the announcement now of the funds available for fiscal 1961 gives the states approximately nine months advance notice for planning their use of the money, and thus provides for continued orderly progress in the program.

Of the \$925 million apportioned to systems other than the interstate system, \$416,250,000 will go to the federal-aid primary system, which comprises 256,000 miles; \$277,500,000 is for the 553,000-mile federal-aid secondary system of farm-to-market and feeder roads, and \$231,250,000 will be for use on the urban portions of the primary and secondary systems.

Out of this \$925 million apportionment, sums totaling about \$51 million were deducted from the individual state allowances as required by law to recoup half of the repayable advances of federal funds made to the states last year in connection with the special \$400 million construction program authorized by the Federal-Aid Highway Act of 1958.

According to Secretary Mueller's announcement, the \$1.8 billion apportioned to the interstate system will continue without interruption the construction of that network.

Individual state apportionments are given in the table on the following page. /NCSA

APPORTIONMENT OF FEDERAL-AID HIGHWAY FUNDS AUTHORIZED
FOR THE FISCAL YEAR 1961

Net Apportionment After Deduction of Repayable Advances

| State | Primary Highway System (\$416,250,000) | Secondary or Feeder Roads (\$277,500,000) | Urban Highways (\$231,250,000) | Subtotal (\$925,000,000) | Interstate System (\$1,800,000,000) | Total (\$2,725,000,000) |
|----------------|---|--|--------------------------------------|-----------------------------|---|----------------------------|
| Alabama | \$ 7,442,365 | \$ 6,317,499 | \$ 2,955,538 | \$16,715,402 | \$35,141,040 | \$51,856,442 |
| Alaska | 22,049,140 | 14,681,518 | 37,861 | 36,768,519 | — | 36,768,519 |
| Arizona | 5,889,574 | 3,857,646 | 866,198 | 10,613,418 | 24,342,120 | 34,955,538 |
| Arkansas | 6,057,332 | 4,657,262 | 1,278,528 | 11,993,122 | 17,695,260 | 29,688,382 |
| California | 17,451,261 | 9,224,241 | 19,946,525 | 46,622,027 | 181,086,840 | 227,708,867 |
| Colorado | 6,747,455 | 4,855,274 | 1,858,997 | 13,461,726 | 13,810,500 | 27,272,226 |
| Connecticut | 2,295,419 | 1,213,581 | 4,446,738 | 7,955,738 | 21,740,400 | 29,696,138 |
| Delaware | 1,904,438 | 1,266,053 | 472,264 | 3,642,755 | 6,272,640 | 9,915,395 |
| Florida | 5,648,757 | 4,046,103 | 4,122,823 | 13,817,683 | 46,171,620 | 59,989,303 |
| Georgia | 8,754,735 | 7,121,855 | 3,285,847 | 19,162,437 | 42,999,660 | 62,162,097 |
| Hawaii | 1,776,483 | 1,373,625 | 774,347 | 3,924,455 | — | 3,924,455 |
| Idaho | 4,554,103 | 2,964,277 | 443,179 | 7,961,559 | 12,295,800 | 20,257,359 |
| Illinois | 13,514,886 | 8,078,909 | 15,975,253 | 37,569,048 | 91,380,960 | 128,950,008 |
| Indiana | 8,197,228 | 6,549,726 | 5,509,086 | 20,256,040 | 51,392,880 | 71,648,920 |
| Iowa | 8,522,408 | 6,478,842 | 2,657,697 | 17,658,947 | 16,911,180 | 34,570,127 |
| Kansas | 8,596,906 | 6,017,373 | 2,060,994 | 16,675,273 | 15,948,900 | 32,624,173 |
| Kentucky | 6,852,530 | 5,505,718 | 2,391,368 | 14,749,616 | 31,327,560 | 46,077,176 |
| Louisiana | 5,782,447 | 3,860,670 | 3,375,566 | 13,018,683 | 47,062,620 | 60,081,303 |
| Maine | 2,809,923 | 2,256,180 | 962,409 | 6,028,512 | 9,159,480 | 15,187,992 |
| Maryland | 3,028,173 | 2,265,566 | 3,908,190 | 9,201,929 | 40,148,460 | 49,350,389 |
| Massachusetts | 4,438,260 | 1,935,586 | 9,347,164 | 15,721,010 | 49,628,700 | 65,349,710 |
| Michigan | 12,415,195 | 7,437,112 | 10,717,581 | 30,569,888 | 70,032,600 | 100,602,488 |
| Minnesota | 10,372,240 | 7,139,053 | 3,749,777 | 21,261,070 | 33,590,700 | 54,851,770 |
| Mississippi | 6,934,681 | 5,860,796 | 1,274,928 | 14,070,405 | 19,566,360 | 33,636,765 |
| Missouri | 10,013,756 | 6,953,814 | 5,671,088 | 22,638,658 | 50,840,460 | 73,479,118 |
| Montana | 7,163,242 | 5,024,030 | 542,242 | 12,729,514 | 20,261,340 | 32,990,854 |
| Nebraska | 6,869,124 | 5,043,895 | 1,350,579 | 13,263,598 | 10,994,940 | 24,258,538 |
| Nevada | 4,519,154 | 3,096,583 | 175,376 | 7,791,113 | 9,319,860 | 17,110,973 |
| New Hampshire | 2,060,438 | 1,373,625 | 681,958 | 4,116,021 | 9,801,000 | 13,917,021 |
| New Jersey | 4,628,033 | 1,889,329 | 9,824,877 | 16,342,239 | 57,665,520 | 74,007,759 |
| New Mexico | 6,389,848 | 4,145,928 | 755,733 | 11,291,509 | 21,348,360 | 32,639,869 |
| New York | 16,991,840 | 6,925,452 | 29,838,686 | 53,755,978 | 88,262,460 | 142,018,438 |
| North Carolina | 8,706,626 | 8,353,086 | 2,938,169 | 19,997,881 | 9,658,440 | 29,656,321 |
| North Dakota | 5,087,595 | 3,505,565 | 389,378 | 8,982,538 | 7,894,260 | 16,876,798 |
| Ohio | 13,066,600 | 7,395,728 | 13,010,692 | 33,473,020 | 116,079,480 | 149,552,500 |
| Oklahoma | 7,863,874 | 5,713,132 | 2,266,894 | 15,843,900 | 16,198,380 | 32,042,280 |
| Oregon | 6,260,565 | 4,373,344 | 1,745,053 | 12,378,962 | 30,882,060 | 43,261,022 |
| Pennsylvania | 14,355,942 | 9,091,531 | 17,371,558 | 40,819,031 | 72,669,960 | 113,488,991 |
| Rhode Island | 1,836,448 | 1,259,305 | 1,646,165 | 4,741,918 | 8,304,120 | 13,046,038 |
| South Carolina | 5,446,586 | 4,541,262 | 1,584,049 | 11,571,897 | 14,683,680 | 26,255,577 |
| South Dakota | 5,331,343 | 4,092,667 | 447,263 | 9,871,273 | 7,555,680 | 17,426,953 |
| Tennessee | 7,773,453 | 6,204,559 | 3,284,489 | 17,262,501 | 52,854,120 | 70,116,621 |
| Texas | 22,510,730 | 15,821,611 | 10,736,526 | 49,068,867 | 80,510,760 | 129,579,627 |
| Utah | 4,617,542 | 3,053,379 | 975,749 | 8,646,670 | 16,661,700 | 25,308,370 |
| Vermont | 1,859,646 | 1,318,517 | 358,552 | 3,536,715 | 16,804,260 | 20,340,975 |
| Virginia | 7,160,604 | 5,272,786 | 3,590,904 | 16,024,294 | 75,503,340 | 91,527,634 |
| Washington | 5,961,996 | 4,163,968 | 3,470,365 | 13,596,329 | 32,272,020 | 45,868,349 |
| West Virginia | 4,272,815 | 3,314,913 | 1,466,825 | 9,054,553 | 22,328,460 | 31,383,013 |
| Wisconsin | 8,651,381 | 5,957,388 | 4,298,531 | 18,907,300 | 18,764,460 | 37,671,760 |
| Wyoming | 4,579,354 | 3,360,183 | 250,381 | 8,189,918 | 18,514,980 | 26,704,898 |
| Dist. of Col. | 1,831,428 | 1,236,697 | 1,989,381 | 5,057,506 | 17,659,620 | 22,717,126 |
| Puerto Rico | 2,015,937 | 2,270,791 | 1,703,225 | 5,989,953 | — | 5,989,953 |

October 8, 1959

Operation Attitude¹

By R. S. B. Holmes

Assistant Director of Safety
United States Steel Corporation
Pittsburgh, Pennsylvania

OPERATION ATTITUDE, the subject of our discussion, is the title chosen by the United States Steel Corporation for the most recent addition to its safety program. That this is a descriptive title is, I am sure, borne out by the fact that each of you—even those hearing it for the first time—are aware that it is an effort to develop and perpetuate those attitudes which culminate in accident avoidance. Statistically, we know that about 15 per cent of our industrial injuries are the result of unsafe conditions and 85 per cent, the result of unsafe acts or practices. Sometimes these unsafe acts or practices stem from inadequate or improper procedures or methods of manufacture. However, altogether too often they are the results of habits of workmanship which grew because they were unrecognized, unchallenged, and uncorrected. Each year, as United States Steel critically appraises its safety performance data, it finds that fewer and fewer disabling injuries are attributed to unsafe conditions. It is only natural, therefore, that some four years ago our safety research was concentrated on this area of attitudes and how they could be made a positive force for accident avoidance. Our research did not start from scratch. We had the benefit of experience born of many “trial and error” attacks on the problem so that we were able to cite clearly our objective as “shaping the thinking and attitudes of employees”—both management and worker—to the end that they assume and accept responsibility for knowing the safe way to do their jobs and for recognizing and protecting themselves from the hazards involved in their daily work.” It was also apparent that to reach “Accident Frequency—Zero”—a realistic and practical goal—it would be necessary to consider additional factors implementing mechanical safeguards, equipment design, safety rules, and safe work procedures. That these elements of a safety program are necessary is obvious, but where safety programs frequently suffer is from concentrating solely on these

elements to the exclusion or detriment of the equally necessary human relations elements. A safety rule—for instance—frequently is considered to be all important, with the technique of how that rule was developed, adopted, and installed being of little consequence or, at best, of secondary importance to the rule itself. As a result, many safety programs reach a performance plateau from which further improvement, regardless of effort expended, seems to produce only sporadic results and occasional success. Analysis of these safety programs would probably reveal considerable emphasis on training but would show little comprehension of other human relation factors and their relationship to accident avoidance.

In recent years the importance of training in safety performance improvement has attained high recognition. That this is also a necessary element of a safety program is obvious; yet training is not the whole answer, for to use training effectively one must recognize that training can only create knowledge of what is safe; it does not necessarily assure that the safe act will be performed. Therefore, as we approach what Knute Rockne called “the concrete yards” in safety, we must retain our skill with mechanical safeguards, equipment design, safety rules, safe work procedures, and training, but, in addition, we must find some means to shape employee attitudes so that these attitudes will stand as a constant motivator assuring that the safe act will be done—that safety know how will be used. We know that to shape employee attitudes the first requisite is to give more attention to employees as individuals. This can be done by having them participate in the development of safety measures and procedures. Studies also indicate that the thinking and attitudes of Foremen must be shaped to impress upon them that only through their recognition of the importance of people can further improvement in safety and productivity be attained. Therefore, our discussion centers not so much on what must be done—this we know—but rather how it is to be accomplished.

¹ Presented at the Cement, Quarry, and Mineral Aggregates Section, National Safety Congress, Conrad Hilton Hotel, Chicago, Illinois, October 22, 1958

The Pattern of Operation Attitude

It would seem to be a fundamental law of human behavior that as the participation of individuals in an undertaking increases, their willingness to assume responsibility also increases. Therefore, Operation Attitude provides for constructive employee participation in safety on the broadest, practicable basis.

Another fundamental well known to you is that injuries result only as employees have contact with some object. If the injurious contact can be avoided, the injury is avoided. Hence, Operation Attitude provides us with safe work procedures based not only on management know how but also on the experience and know how of those who perform the work. The vehicle which is Operation Attitude is now taking shape. Members of management must be thoroughly trained as conference leaders so that they can skillfully lead a conference comprising two or more workers who perform the job to be analyzed and a Foreman who supervises the workers performing the job. Ordinary training as a conference leader would not do because this conference must produce a safe work procedure which will avoid injurious contact. Hence, the method of conference analysis must first list by steps in the job the objects with which an employee performing that step can have contact. Next, the conference must identify the type of contact, i.e., struck by, caught between, or strike against. When the objects and types of contacts are known, the conference must explore and exploit both management and worker experience and know how until a means is found which will either eliminate the contact or reduce the severity of injuries resulting from the contact. It is obvious to you that it is possible to eliminate "caught between" and "struck by" hazards, but so long as we have equipment in plants, "strike against" hazards can never be eliminated; they can only be reduced. For instance, so long as these chairs remain in this room, someone can strike against them and from that contact is the possibility of injury. With this development, the pattern of Operation Attitude is almost complete. We need to add but a few details to make it work.

First, we need small conference rooms where these meetings can be held free from interruptions. These were constructed or otherwise provided.

Second, we need continuous coordination of this program. To provide this coordination, we selected competent General Foremen and relieved them of all other responsibilities so that they could devote full time to this undertaking. We call them Safety Coordinators. These Safety Coordinators receive 40 hours of intensified training to prepare them for their six months' service as Safety Coordinators, at which time they are replaced by other Coordinators, also carefully selected and thoroughly trained.

Third, we need to be able to reduce these safe job procedures to one or two sheets of paper so that they are usable in the field by Foremen as training tools. Now, we, like you, have prepared job safety breakdowns in the past and, like you, have found that the average job safety breakdown runs into several pages of closely typewritten material which, because of its volume, is generally not acceptable in the field by Foremen as a training tool. Also, we found that job safety breakdowns tend to be merely a step by step recording of the way the job is performed and do not necessarily reflect the safe way to perform the job. We licked these problems by studying our own methods of supervising or, like the song, by "Doing What Comes Naturally." A Foreman, for instance, devotes prime attention to problems that are causing him trouble and gives routine supervision to those areas that are performing satisfactorily. In other words, "the squeaking wheel gets the oil." Apply this principle to job safety analyses. Look at your accidents. When you have an accident it does not mean that the whole job procedure has gone awry but usually only one small part of it. This part we call an element. Hence, if recurrence of the injury is to be avoided, this is the part or element that should be the subject of an Operation Attitude study. By this method, the job safety breakdowns growing out of Operation Attitude conferences, which usually last about an hour to an hour and one half, are not voluminous but are simply stated on one page which is readily usable by Foremen in the field as a training tool.

Lastly, in installing Operation Attitude we recognize the fundamental that training or job instruction that is worth giving is worth following up to see that the instruction is followed in practice. Perhaps we can illustrate it this way. Many of you, no doubt, have small daughters and you, like me, have been trying for an endless

number of years to get these small daughters to "clean up" their room before they leave for school. We have threatened and held out the promise of all types of dire results but have lacked the courage to follow through on these threats and promises, and so the fact remains that little girls just don't clean up their rooms. If, on the other hand, the action threatened had been carried through, the picture would be totally different. How many times in your experience have you walked through a mill and seen a man grinding without eye protection? You call to him to put his safety goggles on and he obeys. The next time you walk through the mill you see the same man grinding without eye protection. Again, you call to him and again, he obeys. Isn't this like the threats and promises held out to your little daughter, and doesn't it suggest that so long as you lack the courage to take the necessary action to force that worker to do what is right for his own protection you have failed to instill in him the safe work habits necessary to avoid accidents. So, Operation Attitude, in its installation, dwells heavily on developing in management the training skills necessary to create knowledge of the safe way and also instills that management attitude which recognizes the responsibility of management to take such action as may be appropriate to the case to assure that safe work procedures once installed are continuously followed.

Application of Operation Attitude

Now, let me recap for you and show you how all of this theory has been put to work in the United States Steel Corporation. Basically, the Operation Attitude program is the application of a method of analysis to a segment of a job. This method of analysis is applied in conferences by workers who perform the job and by a Foreman who supervises workers performing the job. The discussion is led by a trained conference leader. Results of the conference are recorded and, when approved, become the safe work procedure. Notice that early in this brief explanation of Operation Attitude the phrase "element of a job" was used. You may wonder why this reference to an "element of a job"—why not the job in its entirety? Investigation reveals that accidents result generally from only one small part of the job. Hence, if recurrence is to be prevented, this is the part which should be immediately studied

and for which safe practices are now needed. The first phase of the Operation Attitude program is the careful selection of a qualified group of operating management personnel to inaugurate the program. These individuals must then receive special training in the conference technique of leadership and problem solving, which includes six distinct steps:

1. Concept of leadership
2. What a leader should do
3. What leader should not do
4. Qualities of a leader
5. Method and preparation of solving a problem (using The Three E's of safety procedure: Education-Engineering-Enforcement)
6. Method of leadership

This training initially extended over a two week period for a total of 80 hours. However, as experience was gained, we have been able to shorten this training to 40 hours without affecting quality. This training provided initially to a small select group of operating management personnel has now been extended so that most Foremen have been provided with this course of study and are now qualified to serve as conference leaders in Operation Attitude meetings.

The most important step in the program is to install effective two way communication between the Foreman and the worker. This is accomplished by having the workers participate in the development of 3 E's analyses for their respective jobs with trained Foremen serving as conference leaders. You recognize, I am sure, that for effective results it is essential that management provide adequate conference rooms in each department or in convenient plant locations where the Foreman and workers may hold meetings away from their jobs in an atmosphere and surroundings conducive to thinking and discussion free from interruptions and distractions.

It is the Department Superintendent's responsibility to set up a schedule of meetings whereby each Foreman is scheduled to hold meetings with workers under his responsibility. The actual selection of the workers for each meeting is left to the Foreman but records are maintained to show that each worker supervised by the Foreman participates on a regular basis. The number of workers selected for each meeting is limited to two to four. These workers then complete the

job study even though this may involve more than one meeting. Upon completion of the assigned analysis, it is submitted to the Safety Coordinator who arranges for review by each Foreman in the department having the same job or element of the job under his responsibility. The analysis carries the names of the worker and the supervisor who made the study. Foremen review the analysis, make comments, changes, or additions as considered necessary or desirable. If changes, additions, or corrections are indicated, the job analysis is returned by the Safety Coordinator to the original Foreman and worker group which made the study. The group then makes the changes considered necessary and submits the analysis for adoption. Before adoption, the analysis is studied by a department review committee which usually comprises the Department Superintendent, the Safety Coordinator, and the Safety Engineer. Should this committee take exception to the analysis for any reason, it is noted and returned to the Foreman and worker group for review and development. If it is approved, it is issued to all Foremen concerned as the approved job procedure.

Learning By Doing

There may be in your mind the question "How is the employee prepared for his part in Operation Attitude?" This preparation would come under the heading of "Learning by Doing." At the start of an Operation Attitude conference and at the time employees are asked to participate, the purpose of the meeting is thoroughly explained to them. From that point on we rely entirely upon the skills of the conference leader to engender discussion; to create employee recognition of hazards; to crystallize employee opinions, experience, and contributions; and to summarize employee conclusion. Employee training is employee participation under the guidance of skilled conference leaders.

By this technique we have secured the constructive participation of employees, we have added to management know how the skills and experience of those who perform the work, and have made a positive contribution to the development of sound employee attitudes toward safety.

In summary, Operation Attitude is a plan for using The Three C's of Safety techniques for the analysis of job elements in small conference groups comprising workers who perform the job

and Foremen who supervise the job. The purpose is twofold:

1. To provide a systematic means for obtaining the experience and knowledge of "those who perform the work" in the preparation of safe job procedures.
2. To increase employee safety awareness and improve safety attitude by employee participation in the formulation of safe work practices.

To accomplish these objectives requires:

1. That members of management be thoroughly trained as conference leaders and in the use of the 3 C's analysis techniques.
2. That a plan for the analysis of job elements on a regular basis be established.
3. That statistical data, accident experience, and unsafe practice reports be used along with management experience to develop the sequence in which elements of jobs shall be analyzed.
4. That Foremen review the results of all Operation Attitude conferences covering job elements over which they have supervision.
5. That Foremen be provided with a copy of all approved safe job procedures developed as a result of Operation Attitude conferences and management review.
6. That all workers performing job elements for which a safe job procedure has been developed be thoroughly instructed in the approved method.
7. That Foremen make periodic safety observations to see that safe job procedures are followed, reporting such observations so that a record is maintained on each Employee's Safety Record Card.
8. That Foremen enforce adherence to safe job procedures by taking necessary and appropriate action when workers instructed in safe job methods are observed not using the approved method.

In practice, this requires the preparation of a list of occupations and job elements to be analyzed, such lists being based on known critical situations within the department. Priority in the analysis of these job elements is assigned based on individual experience, management conferences, or accident experience. A schedule of

Operation Attitude conferences is then prepared under the direction of the Department Superintendent. This schedule establishes the minimum number of such conferences to be held per week and, at the same time, indicates the desired wage earner and management participation, which is cleared and authorized by the Department Superintendent. Scheduled conferences on job elements are led by a member of management with group participation by workers who perform the job element and by Foremen who supervise workers performing the job element. The conference conclusions are recorded on a Job Safety Analysis form by the conference leader, who submits them to all Foremen supervising similar job elements. The conference leader correlates the comments from Foreman review and, if necessary, reschedules an Operation Attitude conference to give additional consideration to the job element. When Foreman agreement is obtained on the Job Safety Analysis form, the conference leader correlates the preparation of Job Instruction Sheets (safe job procedures) and submits the completed Job Instruction Sheets to General Foreman for review and to Department Superintendent for approval.

Records are maintained on a department basis to show job element coverage by Job Safety Analysis together with the number of employee participants and number of employees who have not participated. Weekly evaluation of Operation Attitude activity is made by the Department Superintendent. Single Objective Safety Charts and other departmental safety data may be used to establish the priority of job element analysis.

Responsibilities of Each Level of Management

Approved Job Safety Analyses are given to Foremen who arrange for the instruction of all workers whose jobs include the job elements covered. Follow up by Foreman is maintained through safety observations. To make Operation Attitude work, each level of management must fully perform the following responsibilities.

PLANT MANAGER — Adopts and installs Operation Attitude; approves plan and schedules training of management personnel.

DIVISION SUPERINTENDENT — Provides qualified individuals to be trained in Operation Attitude techniques; establishes a plan for analysis of jobs within the division.

DEPARTMENT SUPERINTENDENT — Provides facilities for effective Operation Attitude meetings; develops a plan to analyze jobs within the department; prepares lists of occupations and job elements to be analyzed; schedules Operation Attitude conferences; arranges for desired wage earner and management participation; provides for review of conference results by Foreman; provides for the preparation of Job Instruction Sheets; approves Job Instruction Sheets; reviews weekly activity report showing jobs covered, number of participants, and number of employees who have not participated.

GENERAL FOREMAN — Assists in identifying job elements to be analyzed; installs safe job procedures.

FOREMAN — Participates in Operation Attitude studies; selects employees to participate in studies; trains workers in methods developed by studies.

GENERAL SUPERVISOR OF SAFETY — Promotes a plant wide program of Operation Attitude.

SAFETY ENGINEER — Reviews progress of Operation Attitude work.

In closing, let me tell you what our operators think of Operation Attitude. I have talked with many of them as individuals and I find that Department Superintendents, General Foremen, and Foremen are of one accord in saying that Operation Attitude is one of the most effective safety tools yet developed. The response from workers is equally encouraging. Operation Attitude is an effective safety tool but it is no panacea — it will work only as we make it work. /NCSA

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Mechanical and Electric Power Furnished
Simultaneously

New Jersey Drilling Co., Inc.

Box 251, Route 206, Netcong, N. J.
Contract Drilling; Quarry Blast Holes

New York Rubber Corp.

100 Park Ave., New York 17, N. Y.
Conveyor Belting; Stonore, Dependable, and
Cameo Grades; Transmission Belting: Silver
Duck Duroflex, Soft Duck Rugged, Com-
mercial Grade Tractor

Nordberg Mfg. Co.

3073 South Chase Ave., Milwaukee 1, Wis.
Symons Cone Crushers, and Symons Gyratory
and Impact Crushers; Gyradisc Crushers;
Grinding Mills; Stone Plant and Cement
Mill Machinery; Vibrating Screens and
Grizzlies; Diesel Engines and Diesel Genera-
tor Units; Mine Hoists; Railway Track Main-
tenance Machinery

Northern Blower Co.

6409 Barberton Ave., Cleveland 2, Ohio
Dust Collecting Systems, Fans—Exhaust and
Blower

Northwest Engineering Co.

135 South LaSalle St., Chicago 3, Ill.
Shovels, Cranes, Draglines, Pullshovels—
Crawler and Truck Mounted

Olin Mathieson Chemical Corp. Energy Division

East Alton, Ill.
Explosives, Blasting Caps, Blasting Accessories

Pennsylvania Crusher Division Bath Iron Works Corp.

323 South Matlack St., West Chester, Pa.
Single Roll Crushers, Impactors, Reversible
Hammermills, Ring Type Granulators, Kue-
Ken Jaw Crushers, Kue-Ken Gyratories,
Non-Clog and Standard One-Way Hammer-
mills

Pettibone Mulliken Corp.

4710 West Division St., Chicago 51, Ill.
Tractor Shovels, Front End Loaders, Swing
Loaders, Yard Cranes, Bucket and Fork
Loaders, Motor Graders, Manganese Steel
Castings, Material Handling Buckets, Clam-
shells, Draglines, Pull Shovel Dippers,
Shovel Dippers, and Pumps

Pioneer Engineering

Division of Poor & Co., Inc.

3200 Como Ave., Minneapolis 14, Minn.
Jaw Crushers, Roll Crushers (Twin and
Triple), Impact Crushers, Hammer-Mills,
Vibrating and Revolving Screens, Feeders
(Reciprocating, Apron, and Pioneer Oro
Manganese Steel), Belt Conveyors, Idlers,
Accessories and Trucks, Portable and Sta-
tionary Crushing and Screening Plants,
Washing Plants, Mining Equipment, Cement
and Lime Equipment, Asphalt Plants,
Mixers, Dryers, and Pavers

Pit and Quarry Publications, Inc.

431 South Dearborn St., Chicago 5, Ill.
Pit and Quarry, Pit and Quarry Handbook,
Pit and Quarry Directory, Modern Concrete,
Concrete Industries Yearbook, Equipment
Distributor's Digest

Manufacturers Division – National Crushed Stone Association
(continued)

Porter, H. K., Co., Inc.
Thermoid Division

Tacony and Comly Sts., Philadelphia 24, Pa.
Conveyor Belts, Hose, and Packings

Productive Equipment Corp.

2926 West Lake St., Chicago 12, Ill.
Vibrating Screens

Rock Products

79 West Monroe St., Chicago 3, Ill.
Publications: Rock Products and Concrete Products

Rogers Iron Works Co.

11th and Pearl Sts., Joplin, Mo.
Jaw Crushers, Roll Crushers, Hammermills, Vibrating Screens, Revolving Screens and Scrubbers, Apron Feeders, Reciprocating Feeders, Roll Grizzlies, Conveyors, Elevators, Portable and Stationary Crushing and Screening Plants, Mine Hoists, Drill Jumbos, Underground Loaders, Iron Castings, Screw Washers, and Classifying Tanks

Schramm, Inc.

West Chester, Pa.
Air Compressors: Portable and Stationary, Gasoline, Diesel, and Electric Driven; Boosters; Pneumattractors, Self-Propelled; Accessories; Bits—Rock; Rotatool Bits, Carbide Insert; Drills, Drilling Equipment; Rotadrills Mounted on Pneumattractors, Trucks and Crawlers; Ready-to-Mount Rotadrills for Mounting on Used Trucks and Crawler Tractors; Rotatools for Bottom-Hole Drilling; Rock Drills; Wagon Drills; Breakers; Accessories

Screen Equipment Co., Inc.

40 Anderson Road, Buffalo 25, N. Y.
Seco Vibrating Screens; Scales—Industrial, Aggregates, Truck

Simplicity Engineering Co.

Durand, Mich.
Simplicity Gyating Screens, Horizontal Screens, Simpli-Flo Screens, Tray Type Screens, Heavy Duty Scalpers, D'Watering Wheels, D'Centegrators, Vibrating Feeders, Vibrating Pan Conveyors, Car Shake-Outs, Woven Wire Screen Cloth, Grizzly Feeders

SKF Industries, Inc.

P. O. Box 6731, Philadelphia 32, Pa.
Anti-Friction Bearings—Self-Aligning Ball, Single Row Deep Groove Ball, Angular Contact Ball, Double Row Deep Groove Ball, Spherical Roller, Cylindrical Roller, Ball Thrust, Spherical Roller Thrust; Tapered Roller Bearings; Pillow Block and Flanged Housings—Ball and Roller

Smith Engineering Works

532 East Capitol Drive, Milwaukee 12, Wis.
Gyratory, Gyrasphere, Jaw and Roll Crushers, Vibrating and Rotary Screens, Gravel Washing and Sand Settling Equipment, Elevators and Conveyors, Feeders, Bin Gates, and Portable Crushing and Screening Plants

Soiltest, Inc.

4711 West North Ave., Chicago 39, Ill.
Laboratory and Field Testing Apparatus: Drilling and Coring Rigs, Sieve Shakers, Sieves, Scales, Balances, Calibration Equipment, Abrasion Testing Machines, Ovens, Furnaces

Stardrill-Keystone

Buffalo Springfield Co.
Division of Koehring Co.

1100 Kenton St., Springfield, Ohio
Drilling Machines: Rotary Air Drills, Churn Drills, Rotary Tools, Rotary Bits, Down-the-Hole Guns, Insert Type Bits, and Water Well Drills

Stedman Foundry & Machine Co., Inc.

P. O. Box 209, Aurora, Ind.
Stedman Impact-Type Selective Reduction Crushers, 2-Stage Swing Hammer Limestone Pulverizers, Multi-Cage Limestone Pulverizers, Vibrating Screens

Stephens-Adamson Mfg. Co.

Ridgeway Ave., Aurora, Ill.
Belt Conveyors, Pan Conveyors, Bucket Elevators, "Amsco" Manganese Steel Pan Feeders, Vibrating Screens, Belt Conveyor Carriers, Bin Gates, Car Pullers, "Sealmaster" Ball Bearing Units, "Saco" Speed Reducers, and Complete Engineered Stone Handling Plants

Taylor-Wharton Co.

Division Harsco Corp.

High Bridge, N. J.
Manganese and Other Special Alloy Steel and Iron Castings; Dipper Teeth, Fronts and Lips; Crawler Treads; Jaw and Cheek Plates; Mantles and Concaves; Pulverizer Hammers and Liners; Asphalt Mixer Liners and Tips; Manganese Nickel Steel Welding Rod and Plate; Elevator, Conveyor, and Dredge Buckets; Pan Feeders

Thew Shovel Co.

East 28th St. and Fulton Road, Lorain, Ohio
"Lorain" Power Shovels, Cranes, Draglines, Clamshells, Hoes on Crawlers and Rubber Tire Mountings: Diesel, Electric, and Gasoline, 3/8 to 2 1/2 Yd. Capacities; "Lorain" Motor-Loader—Rubber Tire Front End Loader 1 3/4 and 2 Yd. Capacity

Manufacturers Division – National Crushed Stone Association

(continued)

Thor Power Tool Co.

175 North State St., Aurora, Ill.

Crawler and Hand-Held Rock Drills, Sump and Sludge Pumps, Clay Diggers, Paving Breakers, Quarry Bars, Sinkers Legs, Drifters, Rock Drilling Jumbos, Raiser Legs, Push Feed Rock Drills, Air and Electric Tools, Accessories, Generator Sets, Concrete Vibrators, Power Trowels, Vibratory Screeds

Torrington Co.

Bantam Bearings Division

3702 West Sample St., South Bend 21, Ind.

Anti-Friction Bearings; Self-Aligning Spherical, Tapered, Cylindrical, and Needle Roller; Roller Thrust; Ball Bearings

Tractomotive Corp.

County Line Road, Deerfield, Ill.

Rubber Tired Front End Loaders (Tractor-Loaders)

Traylor Eng. & Mfg.

Division of Fuller Co.

Allentown, Pa.

Stone Crushing, Gravel, Lime, and Cement Machinery

Trojan Powder Co.

17 North Seventh St., Allentown, Pa.

Explosives and Blasting Supplies

Tyler. W. S. Co.

3615 Superior Ave., N. E., Cleveland 14, Ohio

Woven Wire Screens; Ty-Rock, Tyler-Niagara and Ty-Rocket (Mechanically Vibrated) Screens; Hum-mer Electric Screens; Ro-Tap Testing Sieve Shakers, Tyler Standard Screen Scale Sieves, U. S. Sieve Series

Universal Engineering Corp.

Subsidiary of Pettibone Mulliken Corp.

625 C Ave., N. W., Cedar Rapids, Iowa

Crushers—Jaw, Roll, TwinDual Roll; Hammermills, Impact Breakers, Pulverizers, Bins, Conveyors, Feeders, Screens, Scrubbers. Bulldog Non-Clog Moving Breaker Plate and Stationary Breaker Plate Hammermills, Center Feed Hammermills. Complete Line of Stationary and Portable Crushing, Screening, Washing, and Loading Equipment for Rock, Gravel, Sand, Ore; Aggregate Plants; Asphalt Plants

Vibration Engineering Co.

407 Hazleton National Bank Bldg., Hazleton, Pa.

Consultants on Vibration and Blast Effects; Seismograph Sales, Rental and Record Interpretation; Pre-Blast and Post-Blast Property Inspections; Seismic and Resistivity Rock, Depth Surveys; Rock Velocity Measurements

Vibration Measurement Engineers, Inc.

725 Oakton St., Evanston, Ill.

Seismographic and Airblast Measurements, Seismological Engineering, Blasting Complaint Investigations, Expert Testimony in Blasting Litigation; Complete Seismograph Rental and Record Analysis Service With "Seismolog"

Werco Steel Co.

2151 East 83rd St., Chicago 17, Ill.

Castings—Manganese, Alloy Steel; Screen Plates—Perforated Steel Screen Sections and Decks; Buckets; Chains; Belt Conveyors, Idlers; Dipper—Shovel; Drop Balls; Wire Cloth; Wire Rope and Related Products; Crushers, Pulverizers

Western-Knapp Engineering Co.

50 Church St., New York 7, N. Y.

Plant Design and Construction; Operating Studies; Appraisals

White Motor Co.

842 East 79th St., Cleveland 1, Ohio

On- and Off-Highway Trucks and Tractors—Gasoline- and Diesel-Powered; Industrial Engines—Gasoline and Diesel; Power Units, Axles, Special Machine Assemblies; Power Generating and Distributing Systems; Batteries; All Classes of Maintenance and Repair Service

White Motor Co.

Autocar Division

Exton, Pa.

Custom Engineered, Precision Built Trucks and Tractors for On- or Off-Highway: Gasoline or Diesel Powered, 2 or 3 Axles, Single Axle to All Axle Drives; Planetary Gear Driven Vehicles for Quarry, Mine, and Construction Operations

Wickwire Spencer Steel Division

Colorado Fuel and Iron Corp.

575 Madison Ave., New York 22, N. Y.

Wire Cloth, Screens, Screen Sections, Wire Rope—Slings

Williams Patent Crusher & Pulverizer Co.

2701-2723 North Broadway, St. Louis 6, Mo.

Hammer Mills, Crushers, Pulverizers, Roller Mills, Reversible Impactors, Vibrating Screens, Air Separators, Bins, Feeders





